

# Sustainable South Bronx:

A Community-based Approach to  
Mitigating New York City's  
Urban Heat Island Effect

Rob Crauderueff, January 2006

# SSB Mission

- Improve Environmental Quality of South Bronx
- Improve Economic Opportunities for South Bronx residents
- Advocate for the just distribution of environmental burdens and benefits
- Project-based approach

# Relevant SSB Projects

- South Bronx Greenway
- Hunts Point Vision Plan
- “We Train, You Hire” Ecological Restoration Job Training Program
  - Green Roof Training Program
- Brownfield Redevelopment
  - Includes: Affordable Housing
  - Recycling Industrial Park
- Green Roofs and Cool Roofs
  - Demonstration Project
  - UHI Research
  - Smart Roofs Installation Business

# South Bronx Smart Roof Demonstration Project Team

Partnership between:

- Majora Carter, SSBx Executive Director
- Rob Crauderueff, SSBx Project Manager
- Kathleen Bakewell, Design Director,  
Susanne Boyle, Landscape Design
- Joyce Rosenthal, Research Director,  
Columbia University

# Why a South Bronx Smart Roof Demonstration Project?

- Cool and green roofs address multiple local environmental problems
  - One of hottest parts of city
  - 4 power turbines in South Bronx
  - 15 waste transfer stations
  - 60,000 diesel trucks per week through Hunts Point
  - 2<sup>nd</sup> highest asthma hospitalization rate in country
  - Community of color

# South Bronx Smart Roof Demonstration Project

- 1000 ft<sup>2</sup> Green Roof  
1700 ft<sup>2</sup> Cool Roof
- Modular System
- Semi-Intensive  
Green Roof



# Relevant Project Goals:

- Political Advocacy
- Research:
  - New York City policy-based research
  - Evaluate economic benefits
- Education
- Community Resource

# NYC UHI Research

- Analyzes air quality, energy, public health problems exacerbated by NYC's urban heat island effect
- Cool roofs and green roofs as mitigation strategies
  - Political and Economic Framework
  - NYC and South Bronx Contexts
  - Other UHI Mitigation Strategies Relevant

# *Private and Public Direct Benefits of Green Roofs and Cool Roofs in Relation to their UHI Mitigation Benefits*

<b>Benefit</b>	<b>Private</b>	<b>Public</b>	<b>Market Value?</b>
Energy Savings	Yes	No	Yes
Reduced Stress on Grid & other Energy Transmission Systems	No	Yes	No
Reduced Greenhouse Gas Emissions	No	Yes	No
<b>Filtered Air Pollution*</b>	<b>No</b>	<b>Yes</b>	<b>No</b>
<b>Public Health Benefits of Improved Air Quality</b>	<b>No</b>	<b>Yes (GR &gt;CR)</b>	<b>No</b>
Public Health Benefits Associated with Reduced Building Temperatures	Yes	No	Yes

Note: Benefits of only Green Roofs in **Black\***

Benefits of Both Green Roofs and Cool Roofs in White

Source: Working paper "Urban Heat Island Research and Strategies," Rosenthal, J., Crauderueff, R., Carter, M. Jan 2006. Columbia Earth Institute; Sustainable South Bronx.

# *Private and Public Indirect Benefits of Green Roofs and Cool Roofs in Relation to their UHI Mitigation Benefits*

Indirect Benefits of UHI Mitigation (Cooling City)	Private	Public	Market Value?
Further Energy Savings (Due to Lower Ambient Air Temperatures)	No	Yes	No
Further Reduced Stress on Grid & other Energy Transmission Systems	No	Yes	No
Prevented Power Plant Construction/Re-powering	No	Yes	No
Public Health Benefits of Improved Air Quality + Lower Ambient Air Temperatures	No	Yes	No
Reduced Greenhouse Gas Emissions	No	Yes	No

Note: Benefits of only Green Roofs in **Black**\*

Benefits of Both Green Roofs and Cool Roofs in Black

## Other Private and Public Benefits of Green and Cool Roofs

Co-Benefits	Private	Public	Market Value?
<b>Reduced Water Treatment/CSO*</b>	No	Yes	No
<b>Associated Prevention of Water Treatment Facility Construction*</b>	No	Yes	No
<b>Associated Improvement of Estuary Water Quality*</b>	No	Yes	No
Roof Protection	Yes	No	Yes, but long-term
<b>Building Amenity*</b>	Yes	No	Yes
Educational Tool	Yes (GR more than CR)	Yes	No
<b>Aesthetic Value (Potential addition of open space)*</b>	Yes	Yes	No
<b>Urban Agriculture*</b>	Yes	No	Yes
<b>Biodiversity*</b>	Yes	Yes	No

Charts adapted from Hockert, 2004

Note: Benefits of only Green Roofs in **Black\***

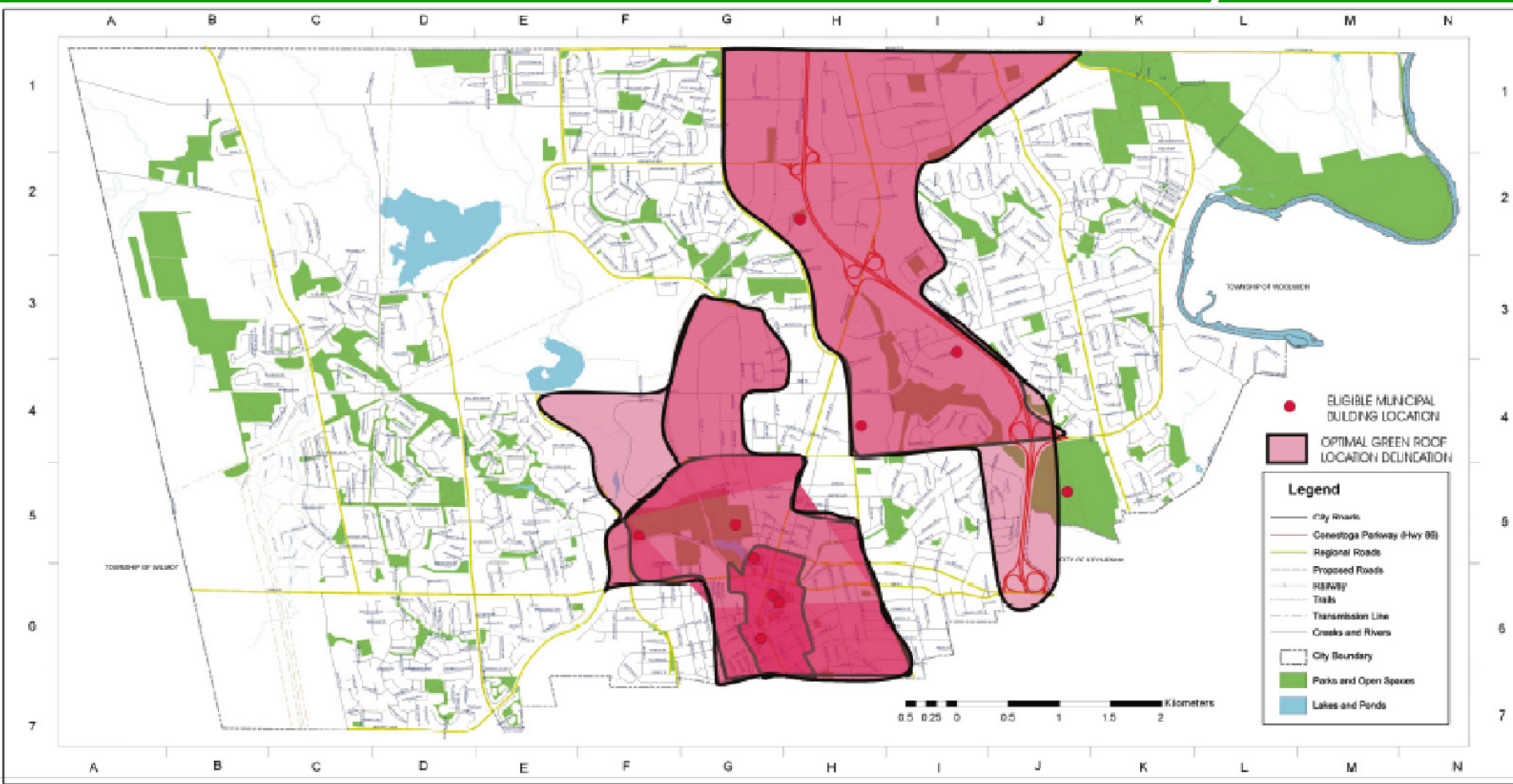
Benefits of Both Green Roofs and Cool Roofs in Black

Source: Ibid

# Key Findings

1. Heat island mitigation strategies should be understood in terms of their multiple benefits
2. Need better understanding of GR benefits in NYC
3. Need better dissemination of CR benefits in NYC
4. Need to assess economic viability in co-benefits of GR's, such as CSO

# Geographic and Demographic Based Cost-Benefit Analysis



# Political Framework

- NYC heat island reduction strategy created and implemented by community-based team supported by City departments
  - City Agencies include: Economic Development Corporation (energy), Department of Environmental Protection (water), Department of Health and Hygiene
- All new City buildings should have a green roof
- Create incentives for private building owners based on interests across departments (Energy Reduction, Asthma Hosp. Rate Reduction, CSO Reduction, etc.)
- Incentives should be proportional with public benefits

# Future Goals

- Push forward community-based UHI mitigation strategy in NYC
- Cool and green roof installation business
  - Living wage jobs to improve environmental and economic well-being of the South Bronx
  - Launch summer, 2006
- Assess cool and green roof capacity in South Bronx